

π -donor BETS based bifunctional superconductor with polymeric dicyanamidomanganate (II) anion layer: κ -(BETS)₂Mn[N(CN)₂]₃

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Mn(dca)₂ was synthesized by the metathesis reaction of MnClO₄·6H₂O with Na[N(CN)] as described in [1]. (Found: C = 26.0, N = 44.5, Mn = 29.9, Cl – absent. Mn[N(CN)₂]₂ requires: C = 25.7, N = 44.9, Mn = 29.4%).

Intensities of 5764 independent reflections with $I \geq 2\sigma(I)$ were obtained on an Enraf-Nonius CAD 4 diffractometer ($\lambda(\text{Mo-K}\alpha) = 0.71070 \text{ \AA}$, ω -scanning, $2\theta_{\text{max}} = 59.92^\circ$, $1.0 \times 0.48 \times 0.07 \text{ mm}^3$ crystal size, correction for absorption included). The structure was determined by the direct method and refined by the full-matrix least-squares method in anisotropic approximation to $R_I = 0.0392$.

Four-probe d.c. and a.c. (10-300 Hz frequency) resistance measurements were performed on single crystals with a typical size of $1 \times 0.4 \times 0.04 \text{ mm}^3$, with the current directed along the plane of conducting layers and perpendicular to them. The samples were irregular hexagons elongated in the direction of the shorter crystallographic b axis. Several samples from the same batch were tested. The results obtained were similar for different samples.

Magnetic measurements were done on a single crystal with a mass of $\approx 95 \mu\text{g}$ in magnetic fields up to 7 T applied parallel to the b -axis using a SQUID magnetometer MPMS XL7 Quantum Design, and in fields up to 15 T using a home made cantilever beam torquemeter.

References

1. Kmety, C. R.; Huang, Q.; Lynn, J. W.; Erwin, R. W.; Manson, J. L.; McCall, S.; Crow, J. E.; Stevenson, K. L.; Miller, J. S.; Epstein, A. *J. Phys. Rev.* **2000**, *62B*, 5576